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NEWS

2023: a year of new climate records

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The latest State of the Climate report published today [Thursday 22 August 2024] confirms that 2023 was a record year for a whole suite of climate indicators.

The findings, co-ordinated by NOAA's National Centers for Environmental Information, are based on contributions from more than 590 scientists, including from the Met Office. The report is published by the Bulletin of the American Meteorological Society (AMS).

Key findings from this year's report include:

- Earth's greenhouse gas concentrations were the highest on record during 2023. Carbon dioxide, methane and nitrous oxide all reached their highest measured atmospheric concentrations during the year.
- 2023 was the warmest year since records began in the mid-1800s, surpassing the previous record set in 2016. The global average surface temperature reached 1.46°C (± 0.1 °C) above pre-industrial levels, according to the HadCRUT5 global temperature dataset. Individually, the last seven months of 2023 (June to December) were also the record warmest. 2023 was the 9th consecutive year >1°C above the pre-industrial average (calculated over the period 1850-1900).
- The highest average annual global sea-surface temperature was recorded during 2023, beating the previous record by 0.13°C. A series of marine heatwaves affected widespread regions of the North Atlantic beginning in June, with local temperature anomalies sometimes exceeding +3°C. Overall, 94% of the global ocean surface experienced at least one marine heatwave.
- Ocean heat content – the measure of heat from the sea surface to a depth of two kilometres – was the highest on record.
- The average global sea level in 2023 was the highest on record for the twelfth successive year.
- Antarctic sea ice reached an all-time record low during 2023.

Dr Robert Dunn, of the Met Office, is one of the report's authors and editors. Commenting on the latest report, he said: "2023 will linger long in the memory of the climate record. Heat from the tropical Pacific courtesy of a strong El Niño event imparted warmth to the planet's atmosphere ensuring that 2023 was going to be a warm year. We have had El Niño events before, but last year was notable as the El Niño coincided with other events, such as the North Atlantic marine heatwave and the all-time low for Antarctic sea ice extent.

"For 34 years, this annual report has been charting the progress of climate change through meticulous analysis of earth observations. The increasing atmospheric concentrations of greenhouse gases is fuelling ever-greater temperatures. And in 2023 the impact of these warmer temperatures on other metrics of our climate system were clear, for example with over 1kg of extra atmospheric water vapour per square metre of the Earth's surface compared to the long-term average, and yet also a record high area of land under extreme drought conditions."

Dr Kate Willett, of the Met Office, added: "Specifically, 2023 more than doubled 2022 in terms of the frequency and intensity of humid days above normal."

The report also notes that plants are responding to the warmer conditions, with full bloom for cherry trees in the Arashiyama district of Kyoto, Japan, occurring on the earliest date in the over-1200-year record.

Heatwaves and droughts contributed to wildfires across the globe, most notably in Canada where they burnt from late spring to early autumn. The fires burnt an area more than twice the size of the island of Ireland, and consumed three times more biomass than the previous record.

Dr Dunn said: "Natural variation in the climate system – such as that driven by El Niño – will ensure a modest amount of year-to-year variability, but until we see greenhouse gas concentrations in the atmosphere begin to decline, then further records are likely before the end of the decade."

More information on the current state of the climate can be found on the Met Office climate dashboard.

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